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Experiential learning using Google Classroom on students' academic performance and motivation in language subject

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ABSTRACT

This study investigates the effectiveness of experiential learning using Google Classroom on year 2 students' academic performance and motivation in Malay language. This study also highlighted the elements in Google Classroom's experiential learning that motivate students to achieve academic performance. The study conducted with 32 students at Chinese primary school in Johor Bahru; utilized online pre-tests, post-tests, and 5-point Likert scale online questionnaire to identify students' motivation level. Results revealed significant improvements in students' Malay language post-test scores, indicating the effectiveness of experiential learning using Google Classroom. Descriptive statistics showed a high level of student motivation, significantly motivated by the experiential learning treatment using Google Classroom, with the materials provided by the teacher being the most preferred by students and effective element in motivating them to achieve academic success. The study suggests that implementing experiential learning with Google Classroom positively influences academic performance in Malay language. Teachers, schools, and communities are suggested to review current learning methods and platforms; and strive to incorporate experiential learning through Google Classroom to enhance students' academic performance in Malay language. Future studies are encouraged to provide more reliable data, particularly within the context of Chinese primary schools in Malaysia, to further enrich educational practices.

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1. INTRODUCTION

According to the Education Act 1996, Malay is Malaysia's national language. If Malay is not the primary medium of instruction in a school, it must still be taught as a compulsory subject. While Malay serves as the national language, some ethnic groups primarily use their native languages, such as Tamil or Mandarin, and regard Malay as a second language. Consequently, Malay language proficiency varies significantly between native and non-native speakers. For non-Malay speakers, proficiency is often developed through formal education in schools [1]. Although Malay has been the medium of instruction in Malaysia since 1983, students who learn Malay as a second language, particularly Chinese and Indian

students, are still influenced by their native languages. This influence can hinder their proficiency in Malay and lead to unsatisfactory academic results. Several studies highlight the challenges faced by non-Malay students, emphasizing the roles of internal factors, external factors, and teaching methodologies in language acquisition [2], [3]. As noted by Izci [4], these challenges arise not only from personal limitations but also from environmental influences and less effective teaching methods.

The COVID-19 pandemic prompted the closure of schools across Malaysia during the movement control order (MCO), leading the Ministry of Education (MoE) to implement home-based learning initiatives. To support these efforts, the MoE introduced Google Classroom as the primary platform for online learning, ensuring students could continue their education while maintaining global educational standards. While many studies [5], [6] focus on Google Classroom in higher education, its impact on primary students' academic performance and motivation in the Malay language remains underexplored. This gap highlights the need for further research. Previous studies indicate that Malaysian schools often prioritize technology adoption over instructional quality or student outcomes [7]. However, research has shown that effective technology use enhances student engagement [8]. For instance, studies in Indonesia found Google Classroom to be effective in improving academic achievement [9], while Hemrungrote *et al.* [10] reported high levels of student satisfaction with the platform.

The Malaysian education system relies on examinations as the primary means of assessing students' academic performance. Teachers use these results to tailor learning experiences to students' cognitive levels. According to previous studies [11], [12], instructional materials significantly impact students' academic performance, facilitating smoother lesson delivery and enhancing the overall teaching and learning experience. As Maclellan and Soden [13] suggests, teaching and learning aim to impart knowledge, and in the early stages, this process often requires the guidance of teachers. Online learning, however, is driving a shift from conventional teaching methods to more interactive and collaborative approaches [14]. It enables the learning process to continue regardless of distance or class size [15].

Recent research by Cacace [16] proposes that Google Classroom effectively enhances students' learning capabilities. Its free availability for teachers and students makes it particularly suitable for developing countries [17]. Google Classroom allows teachers to post teaching materials, assign classwork, and provide immediate feedback on student performance. It also supports the application of experiential learning theories. Experiential learning, introduced by Kolb [18], emphasizes gaining knowledge through experience. Activities such as games, simulations, quizzes, and interactive communication are integral to this approach. In this study, experiential learning activities within Google Classroom included interactive communication through Google Meet, quizzes via Google Forms, and dynamic teaching materials created with Microsoft PowerPoint. Experiential learning is a process in which knowledge is acquired through experience, engaging students' cognitive, psychomotor, and affective domains. It integrates values, behaviors, and cognition, making it an effective method for enhancing learning outcomes. Research suggests that active participation significantly boosts learning effectiveness.

According to Seven [19], motivation stems from two key aspects: motives and incentives. Incentives drive individuals to seek rewards like grades, marks, or certificates, while motives arise from natural impulses or interests shaped by dynamic forces influencing thoughts, emotions, and behavior. Motivation plays a crucial role in teaching and learning, as it determines both direction and effectiveness. Liu [20] highlights the importance of incorporating video activities into teaching materials to boost student motivation. Highly motivated students maintain strong interest in the content, and since interests vary, teachers should use materials and methods tailored to students' needs. In learning Malay, students with a positive attitude, readiness, and high motivation are more likely to master the language.

In Malaysia's education system, Malay language serves as the primary language of instruction [21], and proficiency in it is essential for certification under the Malaysian open certification system. However, non-Malay speakers often face challenges in mastering the language due to limited practice [22]. To address these issues, innovative teaching strategies are needed to enhance engagement and learning outcomes [23]. This study integrates experiential learning elements through Google Classroom to improve year 2 students' academic performance and motivation in the Malay language. The research addresses two key questions:

- What is the effectiveness of experiential learning using Google Classroom on students' academic performance in the Malay language?
- What are the levels of students' motivation in the Malay language based on experiential learning using Google Classroom?

2. RESEARCH METHOD

This section outlines the research design, methodology, data collection methods, and data analysis techniques used to address the research objectives. It explains the systematic approach, details the use of primary and secondary sources, and describes the statistical or analytical tools employed to interpret the data.

2.1. Research design and procedure

The main purpose of the study is to explore and to give an in-depth description on the effectiveness of Google Classroom on year 2 students' motivation and academic performance in Malay language based on experiential learning. This research employed quantitative-method research which comprised of quantitative data analysis. This research specifically used a one-group pretest-posttest design, in which a single group of research participants is pretested, given some treatment and then post-tested.

The research was comprised of 32 year-2 primary school respondents from a National Type Primary School (Chinese) which located in Johor Bahru district, Malaysia. They are non-Malay students who learn Malay language as one of the subjects in the academic curriculum. The respondents are non-native speaker who are using Malay language as their second language, and they are not joining remedial programs. This research was conducted over the course of four weeks and the treatments were done thrice per week. The same respondents have been given the treatment using Google Classroom based on experiential learning. The same teacher and respondents were participated in the treatment. After the pre-test, respondents have been given the treatment in Malay language for one month before conducting the post-test. The pre-test and post-test are to investigate if there is any improvement in their academic performance, which has been carried out using Malay language test that adapted from research. The quantitative data from pre-test and post-test were analyzed using the statistical package for the social sciences (SPSS) software to calculate their mean and standard deviation to answer research questions 1. A paired sample t-test was used due to the research involving only one group of respondents. Paired Sample T-test was also used to analyze if there is a significant difference between pre-test and post-test scores.

An online questionnaire with 5-points Likert scale that using Google Form has been given to respondents after the treatment to gain a broader view on the respondents' motivation and the elements in Google Classroom learning, that motivate them in achieving good academic performance. Quantitative data from online questionnaire has been analyzed using descriptive statistic. The total score, means, and standard deviation of the questionnaire has been calculated. The elements of Google Classroom learning that motivate respondents are also one of the components in an online questionnaire.

At the beginning of the research, respondents were given a pre-test using the Malay language test for year 2 students to test their level of academic performance. The test score for each individual was recorded and tabulated for further comparison. The treatment was started the following week after the pre-test was administered to the respondents. Students were taught using Google Classroom based on experiential learning in Malay language. Students were briefed on the objective and goal that they are going to achieve from the treatment. The treatment was based on Albert Bandura's Social cognitive theory which allows the learners to be self-motivating when they have a final goal on their academic performances. The lessons as the week progresses were based on the annual lesson plan and syllabus in Malay language year 2 "*Kurikulum Standard Sekolah Rendah* (KSSR) Semakan". It is in accordance with the topic the learners will learn from the textbook provided by the MoE in Malaysia. After the treatment, post-test and online questionnaire were given to respondents for the purpose to analyze the effectiveness of Google Classroom on year 2 students' motivation and academic performance in Malay language based on experiential learning.

2.2. Methods of data collection

The Malay language test was given at the beginning and end of the study serving as a pre and post-test. The test in Google Form covered various units learned in the course content. Students are required to read each question and select the appropriate answer. They were given one hour to finish the entire test paper. They are allowed to raise their hand by pressing the raise hand icon if they have any inquiry. Every one of them needs to open their camera while answering the test, so that the teacher can observes the whole period of test and to manage the testing process.

After the pre-test, students were lectured by using Google Classroom based on experiential learning elements in Malay language. Students were advised to learn actively and work cooperatively during the four weeks treatment. The teacher was dedicated to teaching and helping the students in the fulfilment of worksheets as and when they requested help. After a month of treatment, respondents are needed to answer a post-test. The post-test was held under comparable conditions as pre-test, in particular the same virtual classroom and timing of the test. Again, the final scores for each individual were recorded into SPSS for comparison with the pre-test scores.

An online questionnaire with 5-points Likert scale that using Google Form was given to respondents after the treatment to gain a broader view on the respondents' motivation and the elements in Google Classroom learning, that motivate them in achieving good academic performance. Respondents are required to read and fill in the questionnaire cautiously. The teacher has explained and translated the questionnaire when there were students who had enquiry. After finishing the questionnaire, they must submit it in Google Form. The responses that researchers received in Google Form were recorded and tabulated for the analysis.

2.3. Methods of data analysis

The first research question is about the effectiveness of experiential learning using Google Classroom towards students' academic performance in Malay language subject. To answer the first research questions, respondents have taken a Malay language test as a pre-test and post-test to know their academic performance in Malay language before and after using Google Classroom based on experiential learning. The score for each respondent were counted and recorded. The scores will then analyze by using the paired sample t-test (SPSS) and descriptive statistic to compare the mean and standard deviation. The second research question is about the levels of students' motivation in Malay language subject based on experiential learning using Google Classroom. While the third research question is about the elements in experiential learning using Google Classroom, that motivate students in achieving good academic performance. To answer the second and third research questions, respondents have received a set of online questionnaires to be answered after the treatment. The score for each question was recorded and tabulated using the SPSS software. The mean, standard deviation and the results from SPSS will then analyze. These quantitative data is used to study the level of students' motivation and the elements in Google Classroom learning, that motivate students in achieving good academic performance.

3. RESULTS AND DISCUSSION

This section will present the data analysis and the findings of students' academic performance in Malay language subject based on experiential learning using Google Classroom. Besides, it will also present the findings of the levels of students' motivation in Malay language subject and the elements in Google Classroom learning, that motivate students in achieving good academic performance. The analysis of data will be categorized according to the research questions.

3.1. The effectiveness of experiential learning using Google Classroom towards students' academic performance in Malay language subject

Table 1 shows the mean scores, standard deviation and the range of the pre-test and post-test scores. For the pre-test scores, there is a standard deviation of 5.027 in their scores, while for the post-test scores, there is a standard deviation of 6.175 in their scores. This is mainly due to the student's moderate differences in scores. From the range of pre-test scores, the minimum score is 2 while the maximum score is 21. They have a range of 19 scores in the pre-test. The minimum score of post-tests is 5 and the maximum score is 25. They have a range of 20 scores in the post-test.

Table 1. Mean scores of the pre-test and post-test

Test	N	Range	Minimum	Maximum	Mean	Std. Deviation
Pre-test score	32	19	2	21	11.78	5.027
Post-test score	32	20	5	25	15.84	6.175
Valid N (listwise)	32					

When we test normality of data using Shapiro Wilk, results of the normality test reveals that the pre-test and post-test score had a normal distribution as the p-value pre-test score (0.422) and p-value post-test score (0.068) are higher than the alpha value, .05. This shows that the population for the test is normally distributed. Since the population is normally distributed, we can proceed with using the paired-sample t-test. The paired samples statistics are outlined in Table 2. While in Table 3, paired differences in paired sample test are tested and stated.

Table 2. Paired samples statistics

	Test	Mean	N	Std. Deviation	Std. Error mean
Pair 1	Pre-test score	11.78	32	5.027	.889
	Post-test score	15.84	32	6.175	1.092

Table 3. Paired samples test

Mean	Std. Deviation	Std. Error mean	95% Confidence interval of the difference		t	df	Sig. (2-tailed)
			Lower	Upper			
-4.063	2.699	.477	-5.036	-3.089	-8.514	31	.000

Next, to determine if the difference is statistically significant, a paired-sample t-test is used. In Table 3, the analysis shows that there was a significant value between the pre-test scores and post-test scores as the students improved by a large margin after the treatment based on experiential learning using Google Classroom. In Tables 2 and 3, there was a significant difference in the scores for pre-test scores (M=[11.78], SD=5.03) and post test scores (M=[15.84], SD=6.18); t(31)= -8.51, p=0.000. The Sig. (*p*) value is 0.000 which is less than alpha 0.05 and thus shows that there is a significant effect after treatment based on experiential learning using Google Classroom. The minimum scores increased from 2 to 5 while the maximum scores increased from 21 to 25. This is in line with the research conducted by González-Zamar and Abad-Segura [17] who revealed that after students used Google Classroom in learning progress, their vocabulary scores were increased. These results suggested that experiential learning using Google Classroom has a significant impact on the level of students' academic performance in Malay language subject. Furthermore, the mean difference between pre-test and post test scores from the paired sample test shows a significant improvement (M=[-4.06], SD=2.70).

3.2. Level of students' motivation in Malay language subject based on experiential learning using Google Classroom

Table 4 presents descriptive statistics on students' motivation in the Malay language subject, highlighting data distribution, score ranges, and variability. The sum, mean, and standard deviation of each item provide insights into the central tendency and dispersion of motivational levels. Based on the whole finding from the questionnaire on level of students' motivation in Table 4, the highest mean of the data comes from S6 (If I can, I want to get better grades in this class than most of the other students) with a mean of 4.56. It showed that students who used Google Classroom in learning are highly motivated and wish to perform better than others in achieving good academic performance. This is similar with findings of Al-Maroof and Al-Emran [5], students who perceive the use of Google Classrooms as easy and useful, and they are highly motivated toward the incorporation of such pedagogical tools in their learning process. Findings of this study contradict those of Twyman and Tindal study [24] that technology in the classroom helps students in learning. Additionally, the use of ICT and the medium of instruction are also factors that can influence the mastery of the Malay language among non-native speakers [25], [26]. While the lowest mean from the whole data come from S4 (In a class like this, I prefer course material that really challenges me so I can learn new things) with a mean of 3.94. It showed that some students seem worried about the difficulty of course materials, they felt that the course materials at the moments are appropriate with their standard and pace.

Table 4. Descriptive statistics of questionnaire on level of students' motivation

Students	N	Minimum	Maximum	Sum	Mean	Std. Deviation
S1	32	2	5	140	4.38	.660
S2	32	2	5	132	4.13	.871
S3	32	1	5	130	4.06	1.076
S4	32	2	5	126	3.94	.878
S5	32	2	5	140	4.38	.793
S6	32	2	5	146	4.56	.716
S7	32	2	5	128	4.00	.950
S8	32	2	5	129	4.03	.822
S9	32	2	5	133	4.16	.884
S10	32	1	5	133	4.16	1.081
Valid N (listwise)	32					

Furthermore, from the findings, the second highest mean is 4.38 which are S1 (I think I will be able to use what I learn in this course in other courses) and S5 (I'm confident I can understand the basic concepts taught in this course). It clearly indicated that students who have joined experiential learning using Google Classroom are confident on what they have learnt and ready to apply it in other courses. The activities in Google Classroom helped to motivate students in their learning progress. Similar research carried out by McCormick [27] showed that engaging activities can increase student motivation in learning, especially computer-based activities.

Besides, the average mean of the questionnaire for levels of students' motivation in Malay language subject based on experiential learning using Google Classroom is 4.18, which considered high, and students are agreed that Google Classroom helps in motivated them throughout the learning progress. It is in line with Cacace [16] who stated that elements and features in Google Classroom motivate students in learning during the entertainment. In addition, teachers foster the learning process by asking students driving questions and providing appropriate problems will help them maintain interest. By utilize experiential learning in Google

Classroom, it can initiate student's interest on learning something and motivate them to learn by themselves even when they're alone. Therefore, it is in line with the study from Kubischta [28] who found that student-centered learning such as experiential learning as a means for teaching and learning increases the level of student engagement and motivation.

3.3. Elements in experiential learning using Google Classroom that motivate students in achieving good academic performance

Based on the whole finding from the questionnaire on elements in Google Classroom that motivate students in Table 5, the highest standard deviation is S22 which is 1.06, while the lowest standard deviation is S15 which is 0.71. The results of the data from a class of year 2 students are analyzed in two steps. First step is about the overall data. The second step describes about findings of each construct of the questionnaire. Ease of access consists of three items with average $\bar{X}$=4.18 as:

- S11: It is easy to sign in to the Google Classroom which keeps me using it.
- S12: It is easy to access course materials which keeps me using it.
- S13: It is easy to navigate the system which keeps me using it.

Table 5. Descriptive statistics of questionnaire on elements in Google Classroom that motivate students

Samples	N	Sum	Mean	Std. Deviation
S11	32	135	4.22	.832
S12	32	128	4.00	1.047
S13	32	138	4.31	.998
S14	32	135	4.22	.792
S15	32	132	4.13	.707
S16	32	147	4.59	.875
S17	32	138	4.31	.738
S18	32	146	4.56	.759
S19	32	141	4.41	.946
S20	32	139	4.34	.902
S21	32	126	3.94	.982
S22	32	127	3.97	1.062
S23	32	142	4.44	.759
S24	32	140	4.38	.871
S25	32	144	4.50	.718
Valid N (listwise)	32			

The highest score is S13 with an average of 4.31 which means respondents strongly agree that navigate the system is easy in Google Classroom. They are willing to keep using it because the navigation of the system is simple. The lowest score is S12 with an average of 4.00 which means respondents disagree that access course materials in Google Classroom is easy. However, it is still included in the high category. Overall, the result on part ease of access construct showed that most students do not find any difficulties in navigating and operating Google Classroom which means Google Classroom is easy to use in their learning process. This result is similar with Kassim [29], in his research, 89 students' participants agree that Google Classroom is effective and easy to use. Also, in Sutia *et al.* [30], among students' participants, 30 students declare Google Classroom is effective and easy to use.

The part on perceived usefulness construct showed that most students feel Google Classroom is useful as a learning tool. The highest mean is from S14 with score 4.22. Thus, it can be concluded that respondents feel Google Classroom has helped them to submit assignments on time because there is a due date in Google Classroom. In summary, perceived usefulness construct consists of four items with average $\bar{X}$=4.065 as:

- S14: Google classrooms help me to submit assignment on time.
- S15: Google classroom is an excellent medium for social interaction (teacher vs. students and students vs. students).
- S21: The grading system in Google classroom help in monitoring my performance.
- S22: The grading system in Google classroom help in understanding the current topic discussed.

It showed that most students feel Google Classroom is useful as a learning tool. Similar findings in Ghanem [31] study was found to support that students can felt the benefits provided by the e-learning. It also means students agree that it is useful when using Google Classroom. Students also said that Google Classroom can increase the effectiveness in completing the tasks assigned by the faculty. Students develop positive affective feelings towards Google Classroom when they find it easy to use. Moreover, attitude towards use was found to influence continuous use intention.

The part on provided materials construct showed that most students feel satisfied (highest average $\bar{X}$=4.442) with Google Classroom as the materials provided by teachers can motivate them and help them achieve in good academic performance. The incorporation of video activities into the teaching and learning materials serves as a powerful pedagogical tool for promoting motivational developments among students [20]. In summary, provided materials construct consists of five items with highest average $\bar{X}$=4.442 as:

- S16: Slides that used in Google Classroom motivates me and keep my engagement.
- S17: Images that used in Google Classroom motivates me and keep my engagement.
- S18: Videos that used in Google Classroom motivates me and keep my engagement.
- S19: The assignments (quizzes) in Google Classroom are interesting.
- S20: The assignments (quizzes) in Google Classroom motivate me.

It showed that most students feel satisfied with Google Classroom as the materials provided by teachers can motivate them and help them achieve good academic performance. The result is similar with Alim *et al.* [32], students agreed that content of the message/information delivered by the teachers in Google Classroom has been found to be quite complete. In brief, communication and interaction construct consists of three questions with the second highest average $\bar{X}$=4.44 as:

- S23: Teacher is friendly in Google Classroom.
- S24: Teacher is approachable in Google Classroom.
- S25: Teacher could be easily contacted by using Google Classroom.

The highest mean is from S25 with score 4.50. Thus, it can be concluded that respondents found that teachers could be easily contacted in Google Classroom by stream, comment, or private message. The part on Communication and Interaction construct showed that through Google Classroom, most students feel communication and interaction can be easier. Now, they can easily contact teachers anytime and anywhere.

4. CONCLUSION

This research focused on the effectiveness of Google Classroom on year 2 students' academic performance in Malay language among a Chinese primary school's students in Johor Bahru. There was a total of 32 students who completed the treatment. The data obtained revealed experiential learning using Google Classroom to be effective in improving academic performance in Malay language among students. Most of the students had a high level of motivation in Malay language based on experiential learning using Google Classroom which resulted in an improvement in the post-test scores. The materials provided by teachers in Google Classroom are the main elements that motivate students to achieve good academic performance. As a conclusion, the findings of the research shows that Google Classroom is useful and helpful for the students to increase their level of motivation and improve their level of academic performance.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
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R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

This research followed all national rules and institutional policies.

DATA AVAILABILITY

The data supporting the findings of this study are restricted due to privacy concerns, but are available from the corresponding author [NMZ], upon reasonable request.

REFERENCES

[1] N. A. Nor Shaid, S. A. Hamid, and M. Maros, "Exploration of Malay language acquisition and learning experience among Orang Asli Students," *International Journal of Learning, Teaching and Educational Research*, vol. 21, no. 5, pp. 126–142, May 2022, doi: 10.26803/ijlter.21.5.7.

[2] M. Ahmad *et al.*, "The impact of integrating ICT in Malay foreign language teaching and learning," *Journal of Physics: Conference Series*, vol. 1793, no. 1, p. 012070, Feb. 2021, doi: 10.1088/1742-6596/1793/1/012070.

[3] Z. Mahamod, M. Y. Mohamad, and A. R. Jamian, "Malay language learning strategy among Chinese excellent students in Chinese national type school," *Creative Education*, vol. 12, no. 6, pp. 1338–1348, 2021, doi: 10.4236/ce.2021.126102.

[4] K. Izci, "Internal and external factors affecting teachers' adoption of formative assessment to support learning," *International Journal of Educational and Pedagogical Sciences*, vol. 10, no. 8, pp. 2541–2548, 2016.

[5] R. A. S. Al-Maroof and M. Al-Emran, "Students acceptance of Google Classroom: an exploratory study using PLS-SEM approach," *International Journal of Emerging Technologies in Learning (iJET)*, vol. 13, no. 06, p. 112, May 2018, doi: 10.3991/ijet.v13i06.8275.

[6] J. A. Kumar, B. Bervell, and S. Osman, "Google classroom: insights from Malaysian higher education students' and instructors' experiences," *Education and Information Technologies*, vol. 25, no. 5, pp. 4175–4195, Sep. 2020, doi: 10.1007/s10639-020-10163-x.

[7] J. F. Fisher, K. Bushko, and J. White, "Blended beyond borders: a scan of blended learning obstacles and opportunities in Brazil, Malaysia, & South Africa. RR.5.2017," Clayton Christensen Institute for Disruptive Innovation, 2017. [Online]. Available: https://eric.ed.gov/?id=ED586369

[8] S. Kumar, "The impact of technology on students engagement and learning outcomes," *International Journal of Research Publication and Reviews*, vol. 5, no. 4, pp. 9383–9387, Apr. 2024, doi: 10.55248/gengpi.5.0424.1121.

[9] R. P. Murtikusuma, Hobri, A. Fatahillah, S. Hussen, R. R. Prasetyo, and M. A. Alfarisi, "Development of blended learning based on Google Classroom with osing culture theme in mathematics learning," *Journal of Physics: Conference Series*, vol. 1165, no. 1, p. 012017, Feb. 2019, doi: 10.1088/1742-6596/1165/1/012017.

[10] S. Hemrungrote, P. Jakkaew, and S. Assawaboonmee, "Deployment of Google Classroom to enhance SDL cognitive skills: a case study of introduction to information technology course," in *2017 International Conference on Digital Arts, Media and Technology (ICDAMT)*, 2017, pp. 200–204, doi: 10.1109/ICDAMT.2017.7904961.

[11] M. B. Abubakar, "Impact of instructional materials on students' academic performance in physics, in Sokoto-Nigeria," *IOP Conference Series: Earth and Environmental Science*, vol. 476, no. 1, p. 012071, Apr. 2020, doi: 10.1088/1755-1315/476/1/012071.

[12] A.-R. B. Olayinka, "Effects of instructional materials on secondary schools students' academic achievement in social studies in Ekiti State, Nigeria," *World Journal of Education*, vol. 6, no. 1, pp. 32–39, Feb. 2016, doi: 10.5430/wje.v6n1p32.

[13] E. Maclellan and R. Soden, "The significance of knowledge in learning: a psychologically informed analysis of higher education students' perceptions," *International Journal for the Scholarship of Teaching and Learning*, vol. 1, no. 1, p. n1, Jan. 2007, doi: 10.20429/ijsotl.2007.010106.

[14] A. M. Almalki and M. Sabir, "Building learning communities in Saudi EFL online classes," *World Journal of English Language*, vol. 12, no. 8, p. 313, Oct. 2022, doi: 10.5430/wjel.v12n8p313.

[15] B. F. Rahmawati, Zidni, and Suhupawati, "Learning by Google Classroom in students' perception," *Journal of Physics: Conference Series*, vol. 1539, no. 1, p. 012048, May 2020, doi: 10.1088/1742-6596/1539/1/012048.

[16] M. Cacace, "Effects of using Google Classroom on teaching math for students with learning disabilities," M.S. thesis, Rowan University, USA, 2019.

[17] M.-D. González-Zamar and E. Abad-Segura, "Global evidence on flipped learning in higher education," *Education Sciences*, vol. 12, no. 8, p. 515, Jul. 2022, doi: 10.3390/educsci12080515.

[18] D. A. Kolb, *Experiential learning: experience as the source of learning and development*, 2nd ed. Hoboken, NJ: Pearson Education, Inc, 2014.

[19] M. A. Seven, "Motivation in language learning and teaching," *African Educational Research Journal*, vol. 8, no. 2, pp. S62–S71, 2020.

[20] Y. Liu, "The effects of online organic chemistry laboratory videos on students' perceptions and intrinsic motivation," *Journal of Research in Science, Mathematics and Technology Education*, vol. 4, no. 3, pp. 239–255, Sep. 2021, doi: 10.31756/jrmste.435.

[21] I. W. Othman, M. M. al-H. Moharam, H. Ambo, S. M. Abd. Salam, M. K. L. Ahmad, and M. S. Yusoff, "Enhancing the role of the Malay language (MBM) in knowledge augmentation, practical application, skill development, and attitudinal growth," *Journal of Tourism, Hospitality and Environment Management*, vol. 8, no. 34, pp. 113–142, Dec. 2023, doi: 10.35631/JTHEM.834008.

[22] J. Osman, J. B. Mohamad, A. N. Ahmad, and J. R. R. Razali, "Teaching and learning strategies of the Malay language among international students in Universiti Malaysia Pahang," (in Malay), *Pendeta Journal of Malay Language, Education and Literature*, vol. 9, pp. 61–79, Nov. 2018, doi: 10.37134/pendeta.vol9.6.2018.
[23] A. R. Jamian, A. M. Sabil, and S. Othman, "Mastery of language grammar among non-Malay students," *International Journal of Academic Research in Business and Social Sciences*, vol. 7, no. 14, pp. 981–995, Jan. 2018, doi: 10.6007/IJARBSS/v7-i14/3755.
[24] T. Twyman and G. Tindal, "Using a computer-adapted, conceptually based history text to increase comprehension and problem-solving skills of students with disabilities," *Journal of Special Education Technology*, vol. 21, no. 2, pp. 5–16, Mar. 2006, doi: 10.1177/016264340602100201.
[25] H. Yamat, N. F. M. Umar, and M. I. Mahmood, "Upholding the Malay language and strengthening the English language policy: an education reform," *International Education Studies*, vol. 7, no. 13, pp. 197–205, Dec. 2014, doi: 10.5539/ies.v7n13p197.
[26] W. R. Ismail *et al.*, "Students' inclination towards English language as medium of instruction in the teaching of science and mathematics," *Procedia - Social and Behavioral Sciences*, vol. 18, pp. 353–360, 2011, doi: 10.1016/j.sbspro.2011.05.050.
[27] T. M. McCormick, "Historical inquiry with fifth graders: an action research study," *Social Studies Research and Practice*, vol. 3, no. 2, pp. 119–129, Jul. 2008, doi: 10.1108/SSRP-02-2008-B0007.
[28] F. Kubischta, "Engagement and motivation: questioning students on study-motivation, engagement and study strategies," HAAGA-HELIA ammattikorkeakoulu, 2014. [Online]. Available: https://www.theseus.fi/handle/10024/78341
[29] W. Z. W. Kassim, "Google Classroom: Malaysian university students' attitudes towards its use as learning management system," *Brazilian Journal of Development*, vol. 10, no. 1, pp. 207–223.2021, doi: 10.2991/assehr.k.210312.072.
[30] C. Sutia, A. R. Wulan, and R. Solihat, "Students' response to project learning with online guidance through Google Classroom on biology projects," *Journal of Physics: Conference Series*, vol. 1157, no. 2, p. 022084, Feb. 2019, doi: 10.1088/1742-6596/1157/2/022084.
[31] S. Ghanem, "E-learning in higher education to achieve SDG 4: benefits and challenges," in *2020 Second International Sustainability and Resilience Conference: Technology and Innovation in Building Designs (51154)*, Nov. 2020, pp. 1–6, doi: 10.1109/IEEECONF51154.2020.9319981.
[32] N. Alim, W. Linda, F. Gunawan, and M. S. Md Saad, "The effectiveness of Google Classroom as an instructional media: a case of State Islamic Institute of Kendari, Indonesia," *Humanities & Social Sciences Reviews*, vol. 7, no. 2, pp. 240–246, Mar. 2019, doi: 10.18510/hssr.2019.7227.

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